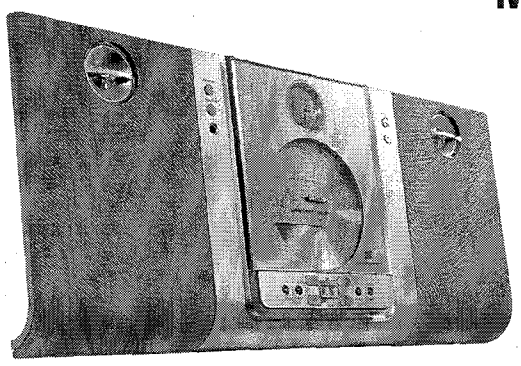
Micro System

MC230/21M/22/25/30

MC235/37

Service
Service
Service



Service Manual

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CLASS 1
LASER PRODUCT

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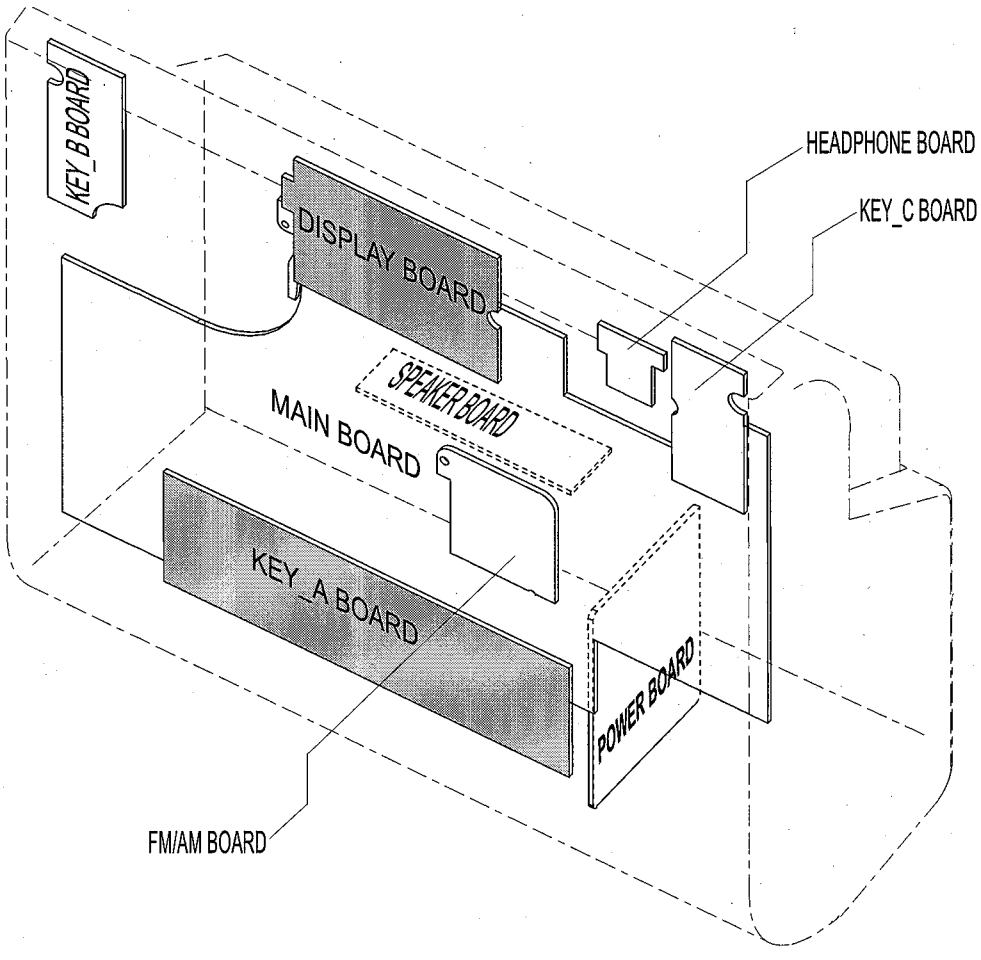
GB 3141 785 30021

Version 1.1

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS



VERSION VARIATIONS:

Type /Versions: / Features & Board in used:	MC230						MC235			
	/21	/22	/25	/30			/37			
Aux in / CDR in	x	x	x	x			x			
Line Out										
Video Out										
Surround Out										
Subwoofer Out										
Power Booster Out										
Digital Out										
Digital in										
Matrix Surround										
RDS		x	x							
News		x	x							
Dolby Pro Logic (DPL)										
Incredible Surround										
Karaoke Features										
Voltage Selector	x									
ECO Power Standby (LCD Display Off)		x	x							
ECO6 Tuner Board - Systems Non-Cenelec	x			x			x			
ECO6 Tuner Board - Systems Cenelec		x	x							
USB PC LINK										

SPECIFICATIONS

GENERAL:

Mains voltage : 120/240V ± 15% Switchable for /21
120V ± 10% for /37
230V ± 10% for /22/25
240V ± 10% for /30
Mains frequency: 50/60Hz
Clock accuracy : < 4 seconds per day
Dimension centre unit : 250 x 245 x 96 (mm)

Power consumption
Active : 15W for /21/22/25/37/30
Standby : < 6W (DEMO mode off)
ECO Power Standby : < 1W for /22/25

TUNER:

FM

Tuning range : 87.5-108MHz
Grid : 50kHz
100kHz for /21/37
IF frequency : 10.7MHz ± 20kHz
Aerial input : 75 Ω coaxial
300 Ω for /37
Sensitivity at 26dB S/N : < 22dBf
Selectivity at 300kHz bandwidth : > 33dB
Image rejection : > 20dB [> 25dB]
Distortion at RF=1mV, dev. 75kHz : < 3%
-3dB Limiting point : < 23.5dB
Crosstalk at RF=1mV, dev. 40kHz : > 26dB

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/37
Grid : 9kHz
10kHz for /21/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial 18.1μH
Sensitivity at 26dB S/N : < 4.0mV/M
[> 3.25mV/M]
Selectivity at 300kHz bandwidth : > 20dB
IF rejection : > 24dB
Image rejection : > 20dB [> 28 dB]
Distortion at RF=50mV, M=80% : < 5%

AMPLIFIER:

Output power
L & R : 2 x 5W FTC (4Ω, 1kHz, 10% THD)
Frequency response within -3dB : 60Hz-14kHz
Digital Sound Control (DSC) : Jazz / Rock / Pop / Classic
Dynamic Bass Boost (DBB) : Jazz / Rock / Pop / Classic

Input sensitivity
Aux in (at 1kHz) : 500mV at 600 Ω
Output sensitivity
Headphone output at 32 ohm : 15mW ± 2dB (Max. vol.)

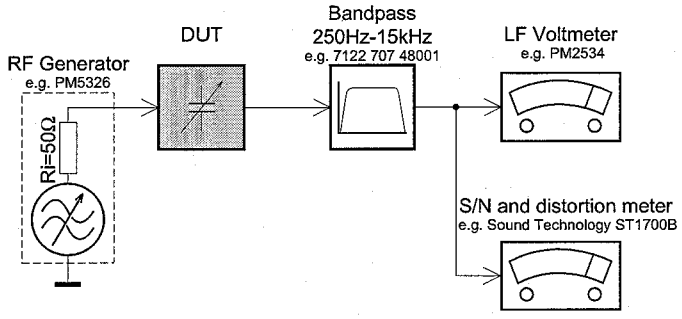
COMPACT DISC:

Frequency response within ± 3dB : 63Hz - 14kHz
Output level (in Vrms) : 500mV, Z_{out} = 100Ω
Signal/Noise ratio (A-weighted): > 67dBA
Distortion at 1kHz : < 0.02%
Channel unbalance at 1kHz : < ±2dB
Channel separation at 1kHz : > 30dB
Emphasis : 15/50 μS (switched automatically by CD10)
THD Noise(1kHz) : < 1.5%
Outband Attenuation : > 35dB

[....] Values indicated are for /22/25 only.

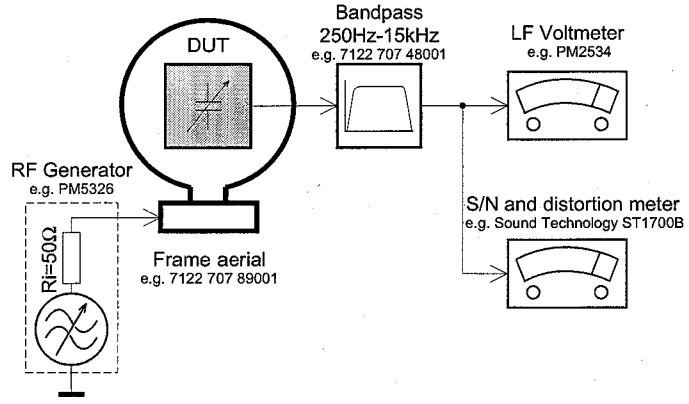
MEASUREMENT SETUP

Tuner FM



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

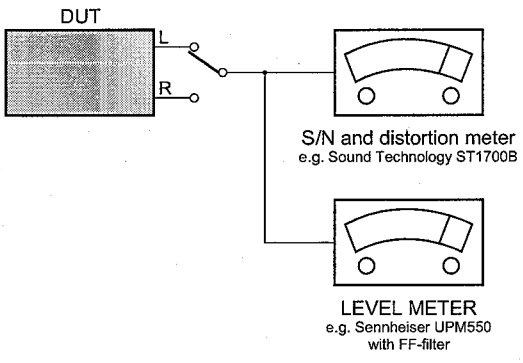
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

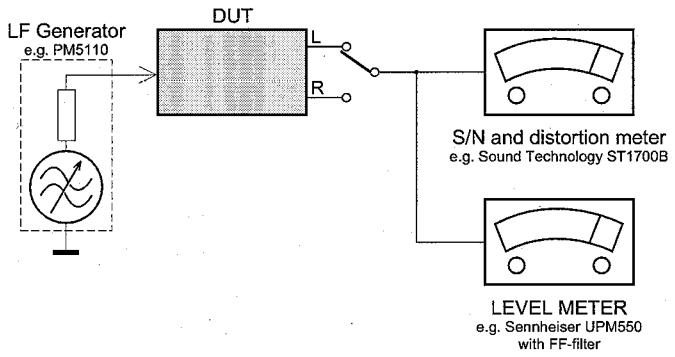
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



SERVICE AIDS

Service Tools:

Universal Torx driver holder 4822 395 91019
Torx bit T10 150mm 4822 395 50456
Torx driver set T6 - T20 ..... 4822 395 50145
Torx driver T10 extended 4822 395 50423

Cassette:

SBC419 Test cassette CrO2 ..... 4822 397 30069
SBC420 Test cassette Fe 4822 397 30071
MTT150 Dolby level 200nWb/M 4822 397 30271

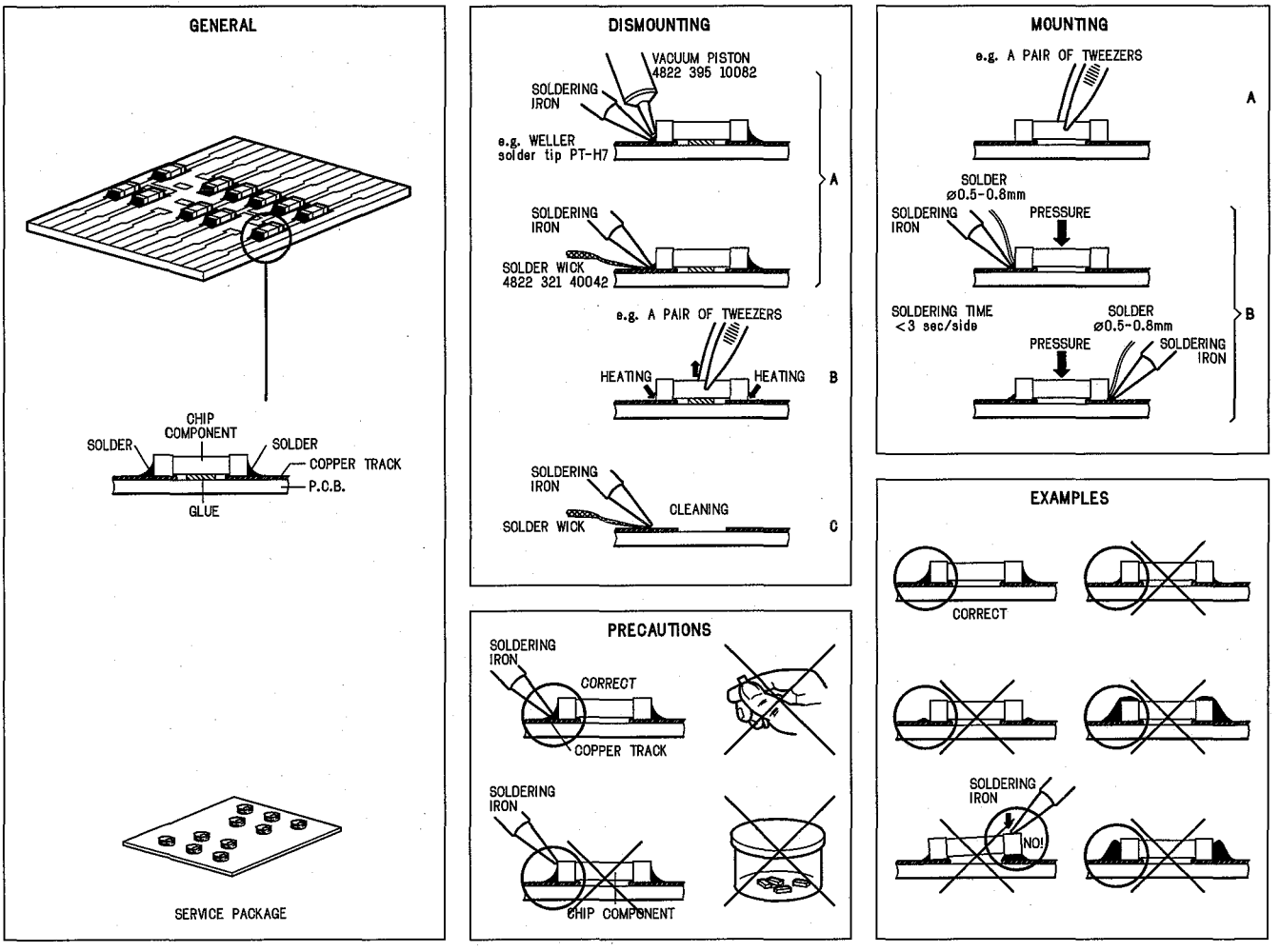
Compact Disc:

SBC426/426A Test disc 5 + 5A 4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz 4822 397 30155
SBC429 Audio Signals disc 4822 397 30184
Dolby Pro-logic Test Disc 4822 395 10216

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm ... 4822 466 10953
Anti-static table mat - small 600x650x1.25mm 4822 466 10958
Anti-static wristband 4822 395 10223
Connector box (1MΩ) 4822 320 11307
Extension cable
(to connect wristband to conn. box) 4822 320 11305
Connecting cable
(to connect table mat to conn. box) 4822 320 11306
Earth cable (to connect product to mat or box) 4822 320 11308
Complete kit ESD3
(combining all above products) 4822 320 10671
Wristband tester 4822 344 13999

HANDLING CHIP COMPONENTS



(GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

ESD

(NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used

Safety components are marked by the symbol ⚠.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(F)

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utiliséés les piéces de rechange identiques à celles spécifiées.

Less composants de sécurité sont marqués ⚠

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(I)

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

Componenty di sicurezza sono marcati con ⚠

(GB)

After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA.

CLASS 1
LASER PRODUCT

(GB) Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(SF) Varoitus !

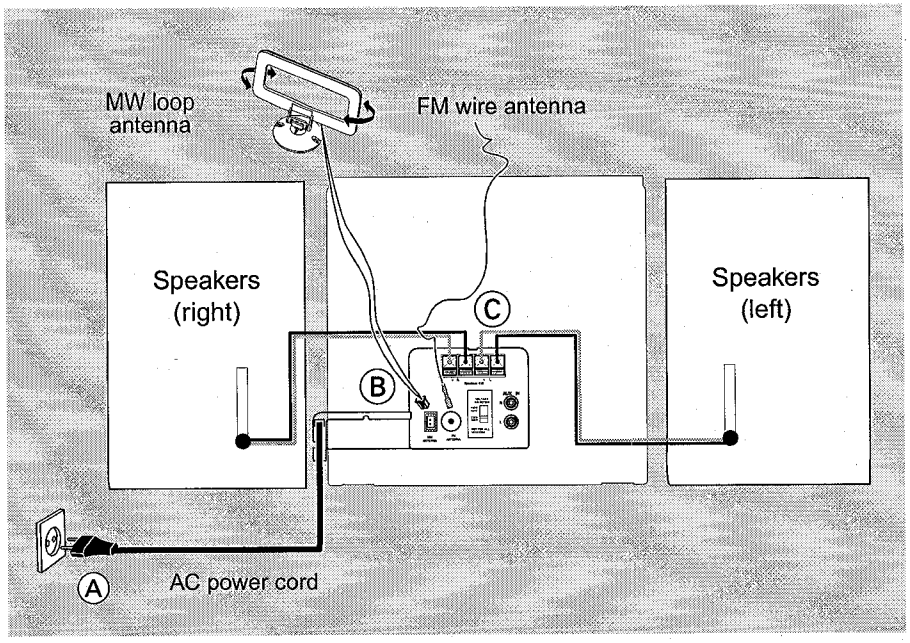
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

(DK) Advarse !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(F)

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".



Rear connections

The type plate is located at the rear of the system.

Ⓐ Power

Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.

– If your system is equipped with a Voltage Selector, set the VOLTAGE SELECTOR to the local power line voltage.

WARNING!

– For optimal performance, use only the original power cable.

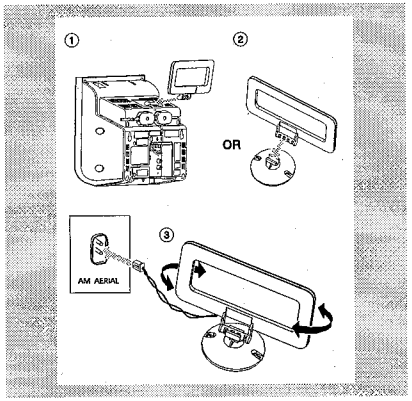
– Never make or change any connections with the power switched on.

To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it *(not available for all versions).*

Ⓑ Antennas Connection

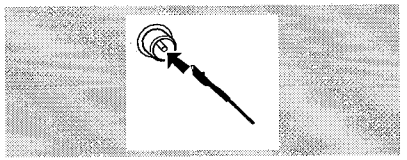
Connect the supplied MW loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

MW Antenna



Position the antenna as far as possible from a TV, VCR or other radiation source.

FM Antenna

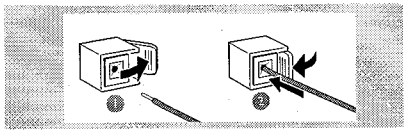


For better FM stereo reception, connect an outdoor FM antenna to the FM AERIAL (FM ANTENNA) terminal.

Ⓒ Speakers Connection

Front Speakers

Connect the speaker wires to the SPEAKERS terminals, right speaker to "**RIGHT**" and left speaker to "**LEFT**", colored (marked) wire to "+" and black (unmarked) wire to "–".



Fully insert the stripped portion of the speaker wire into the terminal as shown.

Notes:

– For optimal sound performance, use the supplied speakers.

– Do not connect more than one speaker to any one pair of +/– speaker terminals.

– Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.

Optional connection

The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

Connecting other equipment to your system

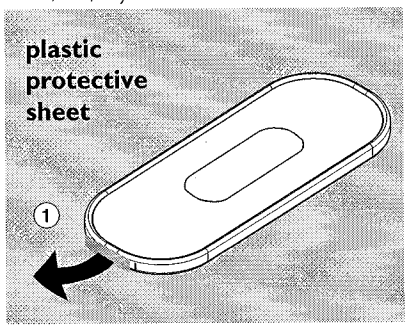
Connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the **AUX-IN** terminals.

Note:

– If you are connecting equipment with a mono output (a single audio out terminal), connect it to the AUX left terminal. Alternatively, you can use a "single to double" cinch cable (the output sound still remain mono).

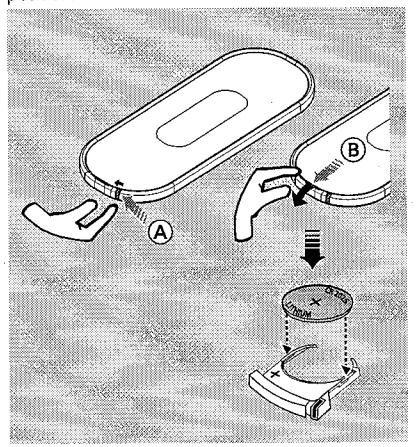
Before using the remote control

1 Pull out the plastic protective sheet.
2 Select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
3 Then select the desired function (for example ▶II , I◀ , ▶I).



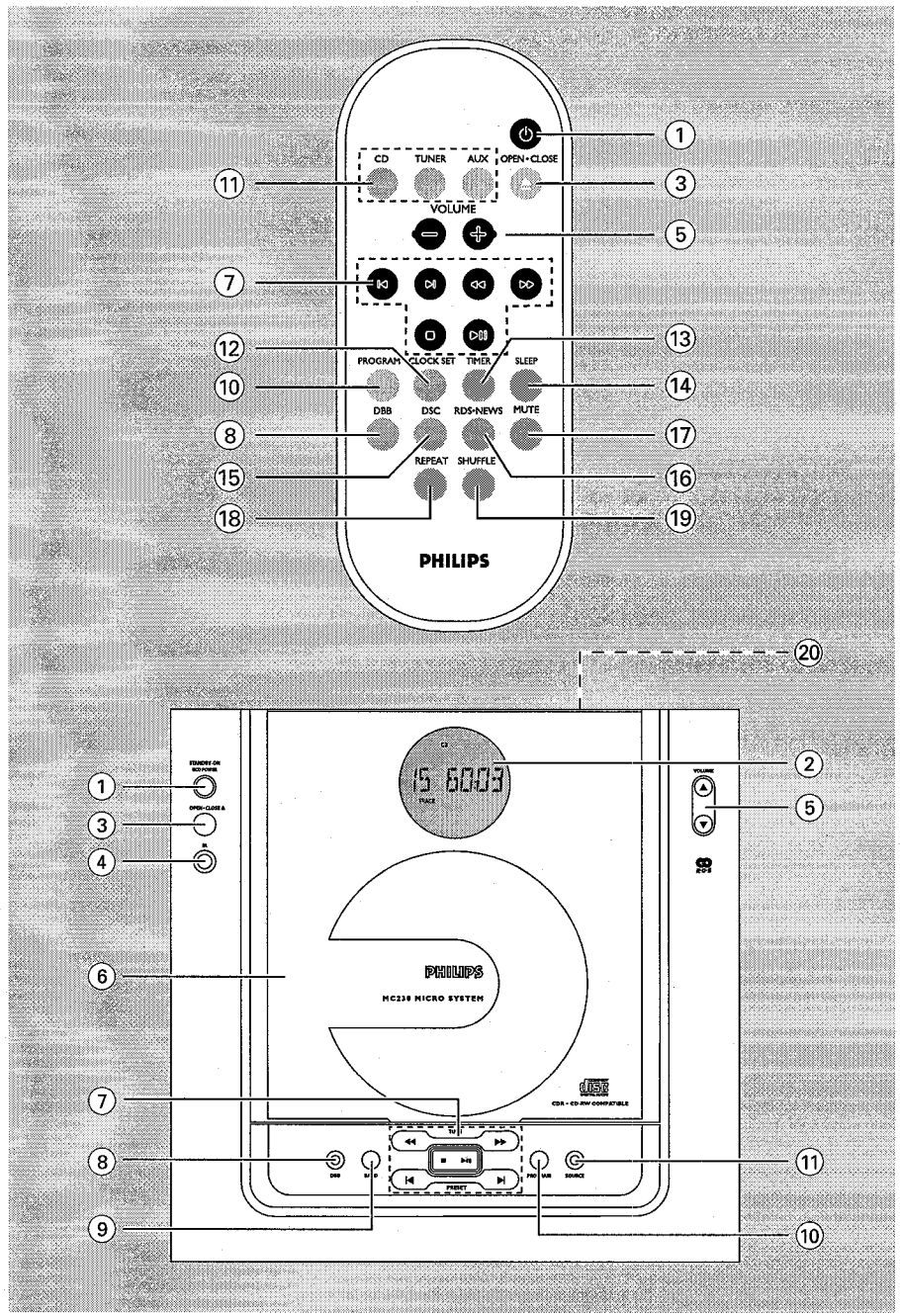
Replacing battery (lithium CR2025) into the remote control

1 Pull out the knob Ⓐ slightly to the left.
2 Pull out the battery compartment Ⓑ .
3 Replace a new battery and fully insert the battery compartment back to the original position.



CAUTION!

Batteries contain chemical substances, so they should be disposed off properly.



Controls

Controls on the system and remote control

① **STANDBY-ON/ ECO POWER**
– switches the system on or to Eco Power standby.

② **Display**
– shows the status of the system.

③ **OPEN • CLOSE ▲**
– opens/ closes the CD door.

④ **IR**
– remote sensor

⑤ **VOLUME (▲ /▼) (+/–)**
– adjusts the volume level.

⑥ **CD Door**

⑦ **Mode Selection**
SEARCH/TUNE (◀◀ / ▶▶)
for TUNER ..... tunes to a station
for CD ..... fast searches back and forward within a track/ CD.
STOP ■ ..... stops CD playback or erase a CD programme.
PLAY ▶II ..... starts or interrupts playback.
PRESET (I◀ / ▶I)
for TUNER ..... selects a preset radio station.
for CD ..... skips to the beginning of a current track/ previous/ subsequent track

⑧ **DBB (Dynamic Bass Boost)**
– enhances the bass.

⑨ **BAND**
– selects a waveband.

⑩ **PROGRAM**
for CD ..... programmes tracks and reviews the programme.
for TUNER ..... programmes tuner stations.

⑪ **SOURCE**
– selects the respective sound source for CD/ TUNER/ AUX.

⑫ **CLOCK SET**
– sets the clock function.
– views the clock.

⑬ **TIMER**
– activates/ deactivates or sets the timer function

⑭ **SLEEP**
– activates/deactivates or selects the sleeper time.

⑮ **DSC (Digital Sound Control)**
– selects sound characteristics: ROCK/ JAZZ/ POP/ CLASSIC.

⑯ **RDS.NEWS**
– activates RDS news and Traffic Announcement.
– for tuner, displays RDS information.

⑰ **MUTE**
– interrupts and resumes sound reproduction.

⑱ **REPEAT**
– repeats a track/ CD programme/ entire CD.

⑲ **SHUFFLE**
– plays CD tracks in random order.

⑳ 🎧
– connects headphones

Notes for remote control:
– First select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
– Then select the desired function (for example ▶II, I◀ , ▶I).

Important notes for users in the U.K.

Mains plug

This apparatus is fitted with an approved 13 Amp plug. To change a fuse in this type of plug proceed as follows:

1. Remove fuse cover and fuse.
2. Fix new fuse which should be a BS1362 5 Amp, A.S.T.A. or BSI approved type.
3. Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.
If the mains plug contains a fuse, this should have a value of 5 Amp. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 5 Amp.

Note: The severed plug must be disposed of to avoid a possible shock hazard should it be inserted into a 13 Amp socket elsewhere.

How to connect a plug

The wires in the mains lead are coloured with the following code: blue = neutral (N), brown = live (L).

- As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:
  – Connect the blue wire to the terminal marked N or coloured black.
  – Connect the brown wire to the terminal marked L or coloured red.
  – Do not connect either wire to the earth terminal in the plug, marked E (or ⏚) or coloured green (or green and yellow).

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead - not simply over the two wires.

Copyright in the U.K.

Recording and playback of material may require consent. See Copyright Act 1956 and The Performer's Protection Acts 1958 to 1972.

Italia

DICHIARAZIONE DI CONFORMITA'

Si dichiara che l'apparecchio MC230, MC235 Philips risponde alle prescrizioni dell'art. 2 comma 1 del D.M. 28 Agosto 1995 n. 548.

Fatto a Eindhoven

Philips Consumer Electronics
Philips, Glaslaan 2
5616 JB Eindhoven, The Netherlands

Norge

Typeskilt finnes på apparatens underside.

Observer: Nettbryteren er sekundert innkoplet. Den innebygde netdelen er derfor ikke frakoplet nettet så lenge apparatet er tilsluttet nettkontakten.

For å redusere faren for brann eller elektrisk støt, skal apparatet ikke utsettes for regn eller fuktighet.

CAUTION

Use of controls or adjustments or performance of procedures other than herein may result in hazardous radiation exposure or other unsafe operation.

VAROITUS

Muiden kuin tässä esitettyjen toimintojen säädön tai asetusten muutto saattaa altistaa vaaralliselle säteilylle tai muille vaarallisille toiminnoille.

Troubleshooting

WARNING

Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.

If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or Philips for help.

Problem	Solution
CD OPERATION	
"NO DISC" is displayed.	– Insert a disc. – Check if the disc is inserted upside down. – Wait until the moisture condensation at the lens has cleared. – Replace or clean the disc, see "Maintenance". – Use a finalised CD-RW or CD-R.
RADIO RECEPTION	
Radio reception is poor.	– If the signal is too weak, adjust the antenna or connect an external antenna for better reception. – Increase the distance between the Micro HiFi System and your TV or VCR.
GENERAL	
The system does not react when buttons are pressed.	– Remove and reconnect the AC power plug and switch on the system again.
Sound cannot be heard or is of poor quality.	– Adjust the volume. – Disconnect the headphones. – Check that the speakers are connected correctly. – Check if the stripped speaker wire is clamped.
The left and right sound outputs are reversed.	– Check the speaker connections and location.
The remote control does not function properly.	– Select the source (CD or TUNER, for example) before pressing the function button (▶II , I◀, ▶I). – Reduce the distance between the remote control and the system. – Insert the battery with its polarities (+/– signs) aligned as indicated. – Replace the battery. – Point the remote control directly toward IR sensor on the front of the system.
The timer is not working.	– Set the clock correctly. – Press TIMER to switch on the timer.
The Clock/Timer setting is erased.	– Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.

DISMANTLING INSTRUCTIONS

Dismantling of the Rear Portion

1) Remove 11 screws A and B as indicated to remove the Rear Cabinet.
2) Remove 2 screws C as indicated to loosen the Speaker Wire Holder.
3) Remove 2 screws D as indicated to loosen the Speaker Board .
4) Remove 2 screws E as indicated to loosen the AUX IN jack.

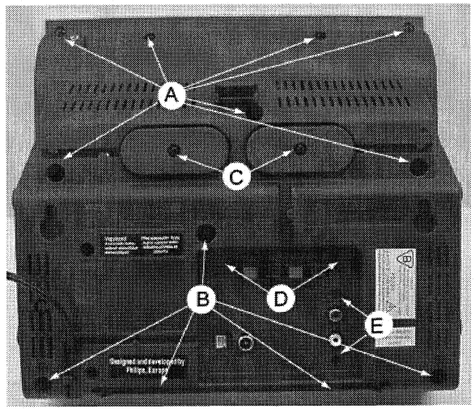


Figure 1

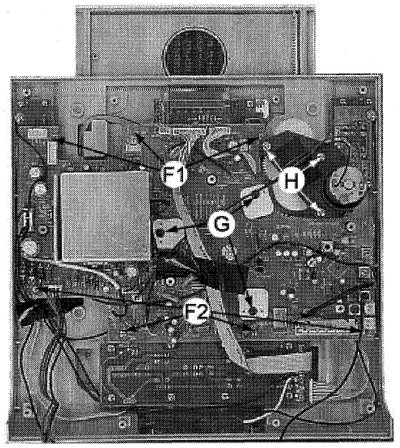


Figure 2

Dismantling of the Front Boards and CD Door

1) Loosen 3 screws G each to remove the CD Mechanism Holder Bracket.

2) Loosen 7 screws F1 and F2 as indicated to remove the Main Board.

3) Remove 3 screws H as indicated to loosen the Gear Motor Module.

4) Loosen 4 screws I (see Figure 3) to remove the Key_C Board.

5) Loosen 2 screws J (see Figure 3) to remove the Display Board.

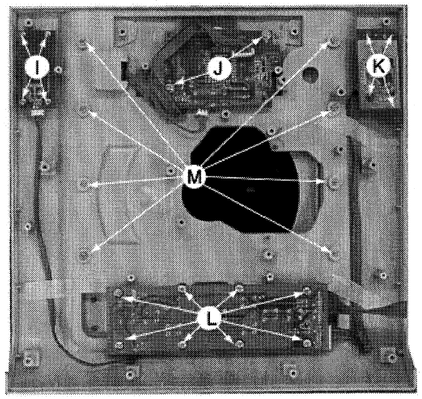


Figure 3

6) Loosen 4 screws K (see Figure 3) to remove the Key_B Board.

7) Loosen 8 screws L (see Figure 3) to remove the Key_A Board.

8) Loosen 8 screws M (see Figure 3) to remove the Door Eject Lever Bracket Right/Left, then remove CD door.

2-1

DISMANTLING INSTRUCTIONS

Repair Hints & Service Positions

Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occurs.

Service position A

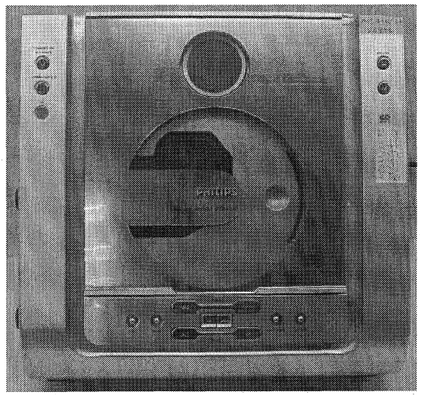


Figure 4

Service position B

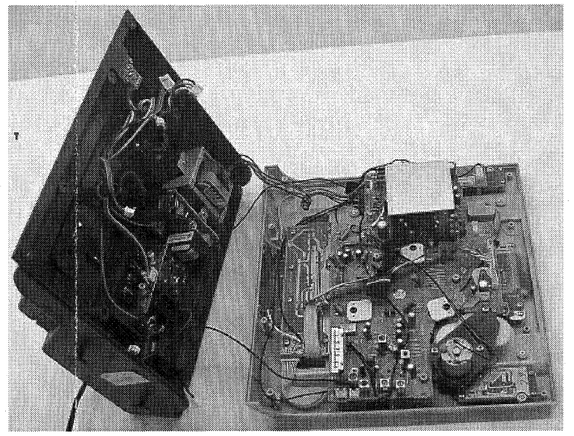


Figure 5

Service position C

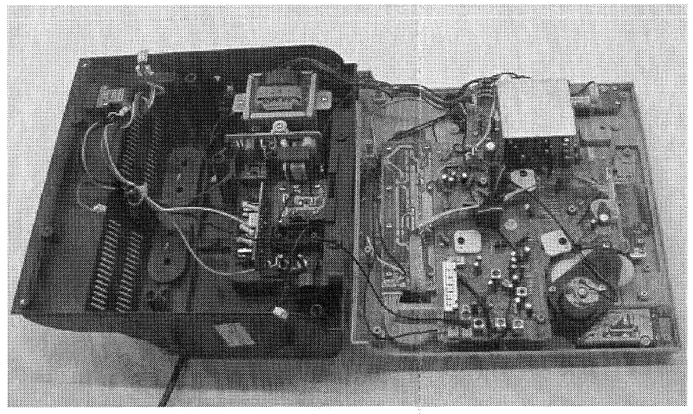


Figure 6

3-1

SERVICE TEST PROGRAM

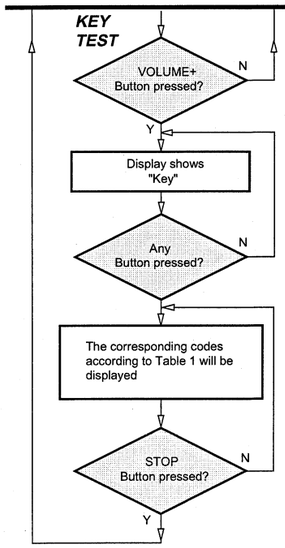
To start service test program
PLAY & SOURCE
depressed while
plugging in the mains cord

Display shows the
ROM version
"VER XXX"
(Main menu)

VER refers to Version

XXX refers to Software version number of the uProcessor
(counting up from 010 to 999)

KEY TEST



COMPACT DISC TEST

Note : Disc should be available on the tray before entering the Service Test Mode.

KEY	DISPLAY	MESSAGE		ACTION
		OKAY	ERROR	
NEXT	MOTOR 1	-	-	Disc motor turns clockwise, motor power 50%.
PREV	MOTOR 2	-	-	Disc motor turns counter clockwise, motor power 50%
▶▶	SLE OUT	-	-	Slide moves outside.
◀◀	SLE IN	-	-	Slide moves inside.
STOP	-	-	-	Exit to main menu.
PLAY	FOCUS	-	-	Enter focus servo test.

Main Set Key	DISPLAY
STANDBY-ON	32
OPEN*CLOSE	29
SOURCE-	11
DBB	17
BAND	10
PROGRAM	14
▶▶	18
◀◀	19
PLAY	20
VOLUME+	24
VOLUME-	23
PREVIOUS(⏮)	12
NEXT (⏭)	13

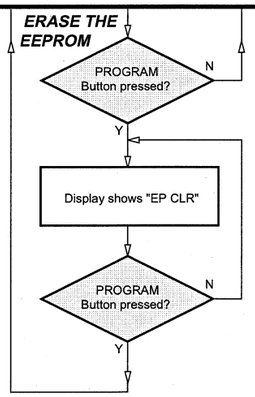
Table 1

REMOTE CONTROL KEY TEST

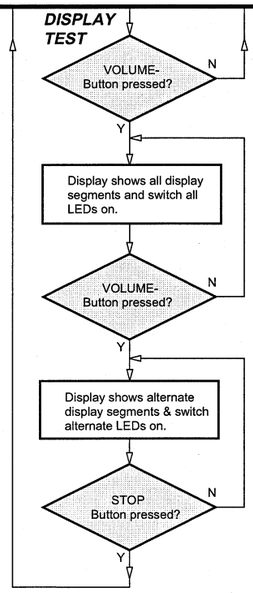
R-C Key	DISPLAY	REMARK
POWER	12	
CD	63	
TUNER	63	
AUX	63	
OPEN*CLOSE	45	
DBB	70	
PROG	36	
REPEAT	29	
SHUFFLE	26	
PLAY	53	
VOL+	16	
VOL-	17	
MUTE	13	
RDS * NEWS	15	
▶▶	52	
◀◀	50	
PREVIOUS(⏮)	33	
NEXT (⏭)	32	
STOP	"VER XXX"	Exit to main menu
CLOCK SET	42	
TIMER	89	
SLEEP	38	

Note : In Key test mode, if a key on the remote control is pressed,
the display shows its corresponding code in track area.

ERASE THE EEPROM

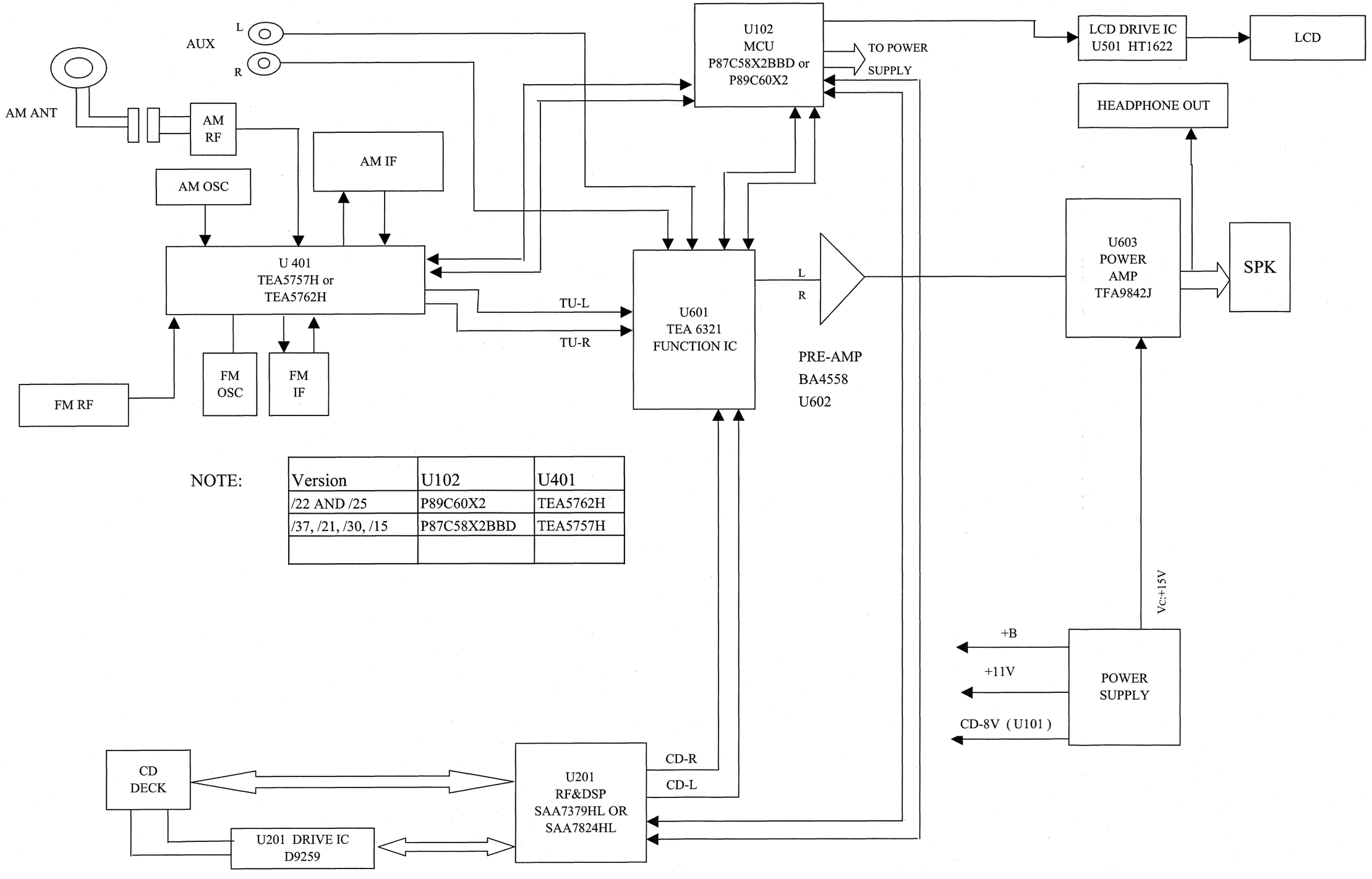


DISPLAY TEST



4-1

SET BLOCK DIAGRAM

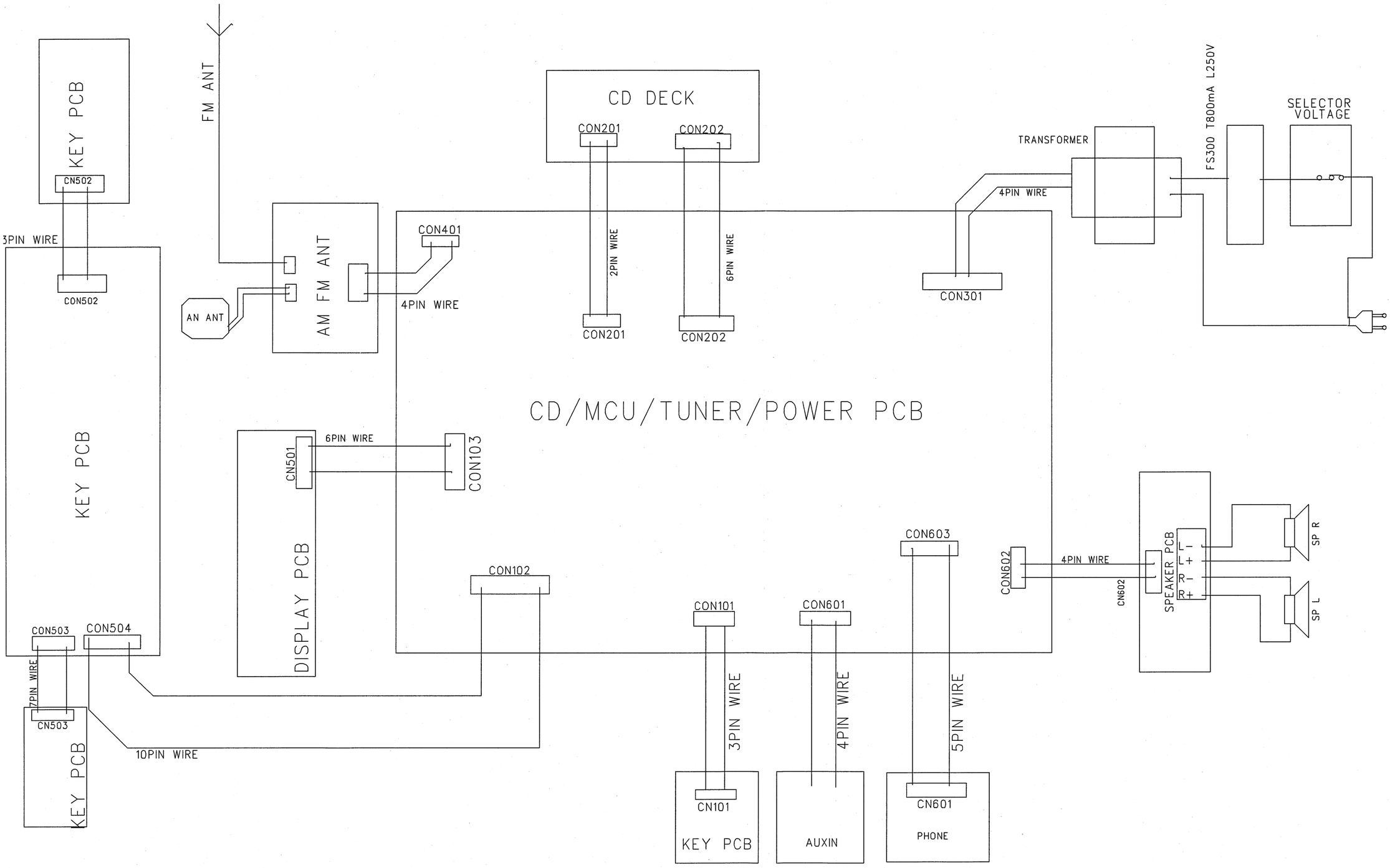


NOTE:

Version	U102	U401
/22 AND /25	P89C60X2	TEA5762H
/37, /21, /30, /15	P87C58X2BBD	TEA5757H

5-1

SET WIRING DIAGRAM



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POWER BOARD

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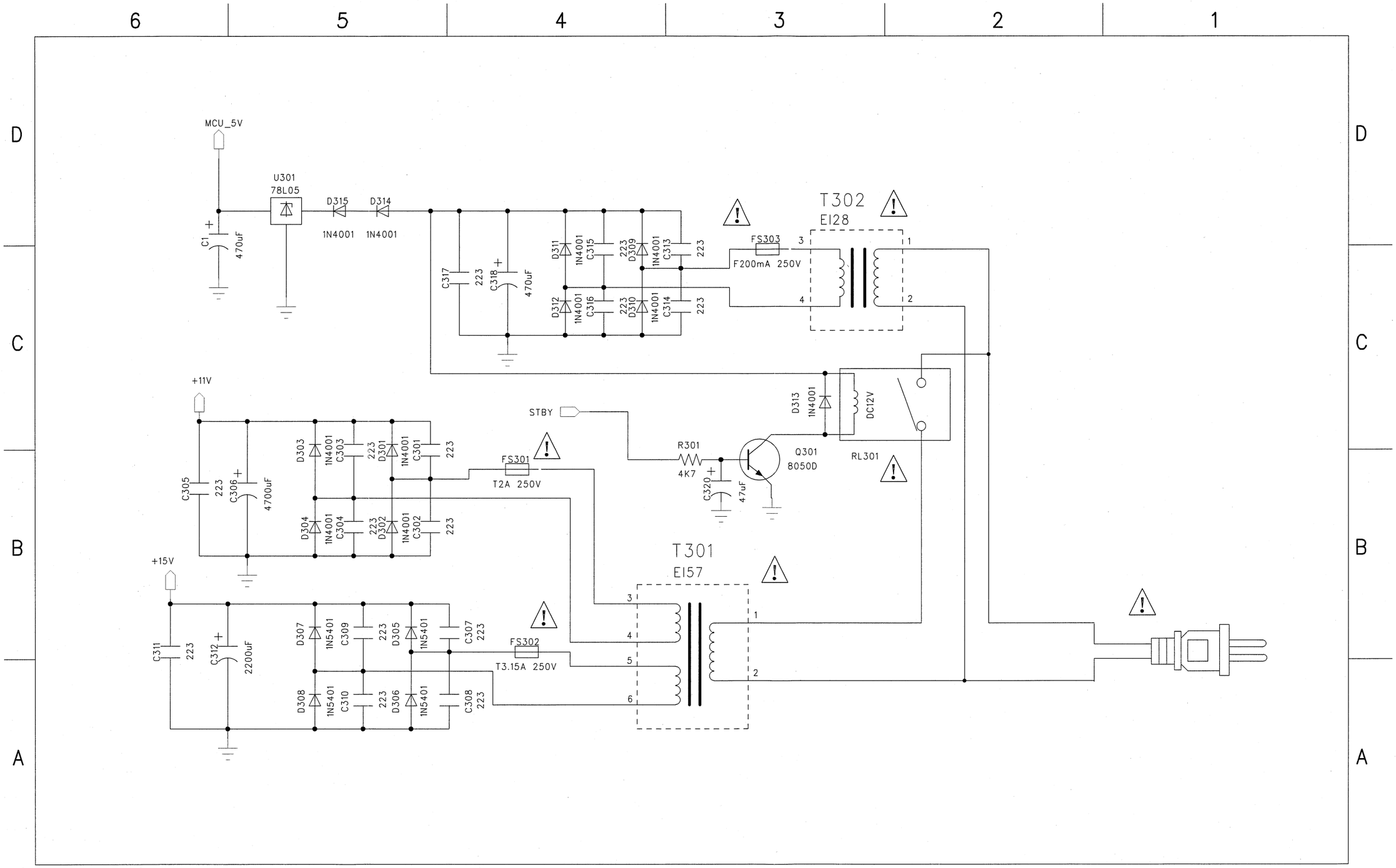
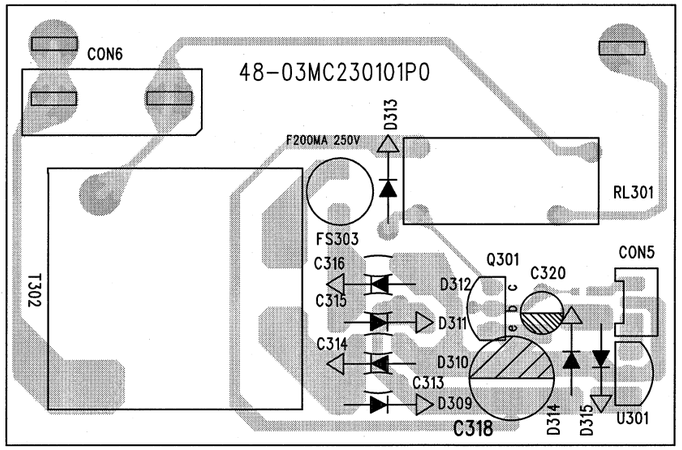
CIRCUIT DIAGRAM

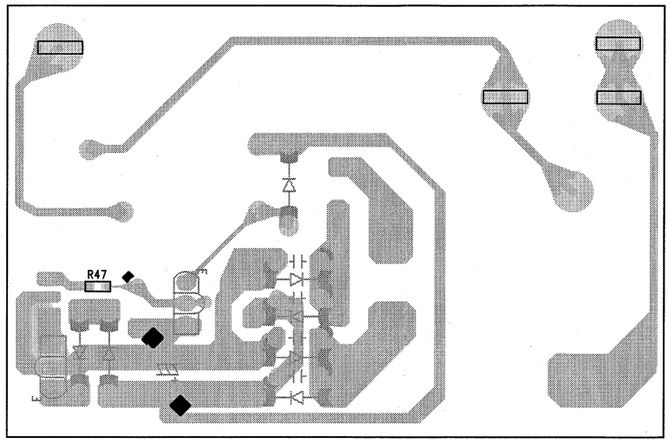


LAYOUT DIAGRAM - POWER BOARD
COMPONENT SIDE



6-3

LAYOUT DIAGRAM - POWER BOARD
SMD SIDE



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KEY BOARD

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Layout Diagram-SMD 8-3
Layout Diagram-Component 8-4
Layout Diagram-SMD 8-4

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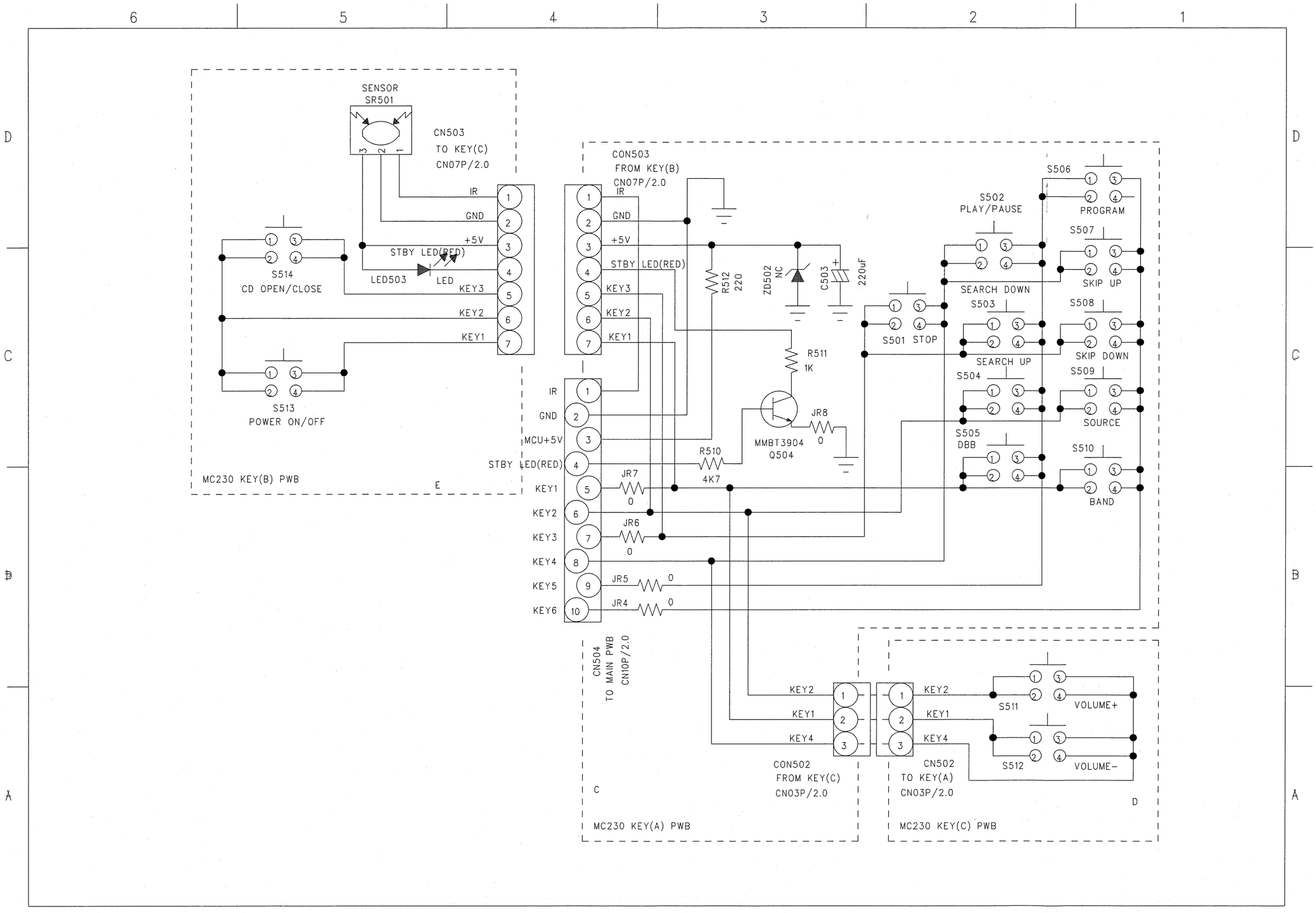
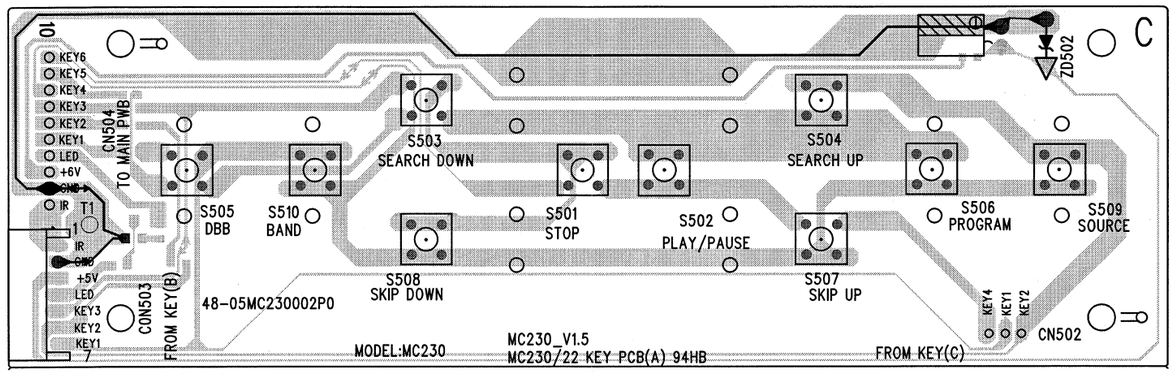
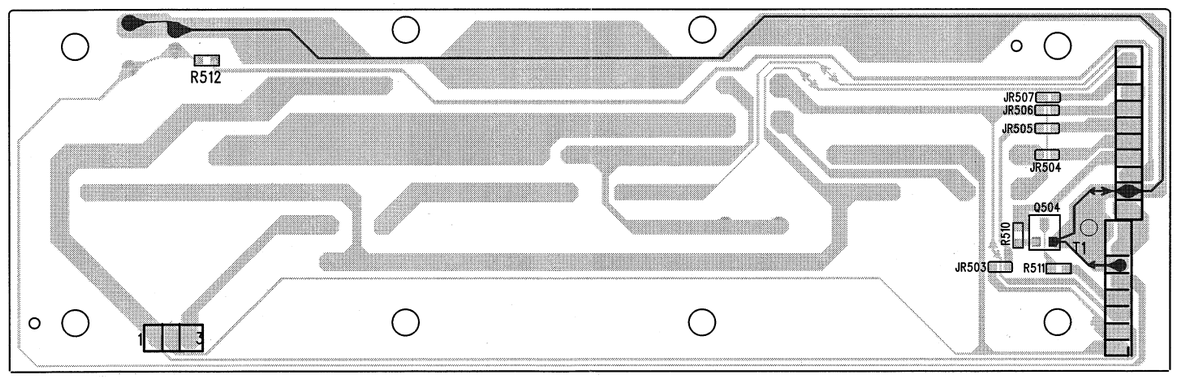
CIRCUIT DIAGRAM - FRONT BOARD



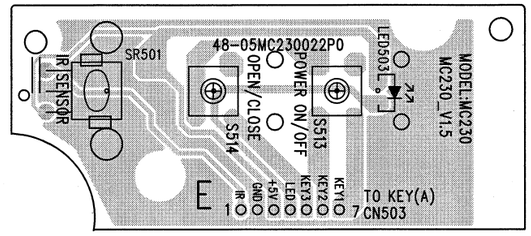
LAYOUT DIAGRAM - KEY_A BOARD
COMPONENT SIDE



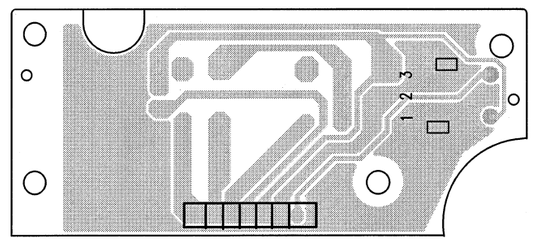
LAYOUT DIAGRAM - KEY_A BOARD
SMD SIDE



LAYOUT DIAGRAM - KEY_B BOARD
COMPONENT SIDE

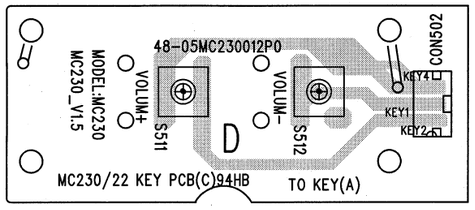


LAYOUT DIAGRAM - KEY_B BOARD
SMD SIDE

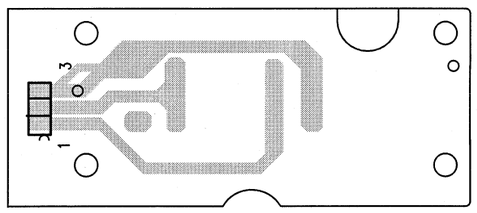


7-4

LAYOUT DIAGRAM - KEY_C BOARD
COMPONENT SIDE



LAYOUT DIAGRAM - KEY_C BOARD
SMD SIDE



MAIN BOARD

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BLOCK DIAGRAM

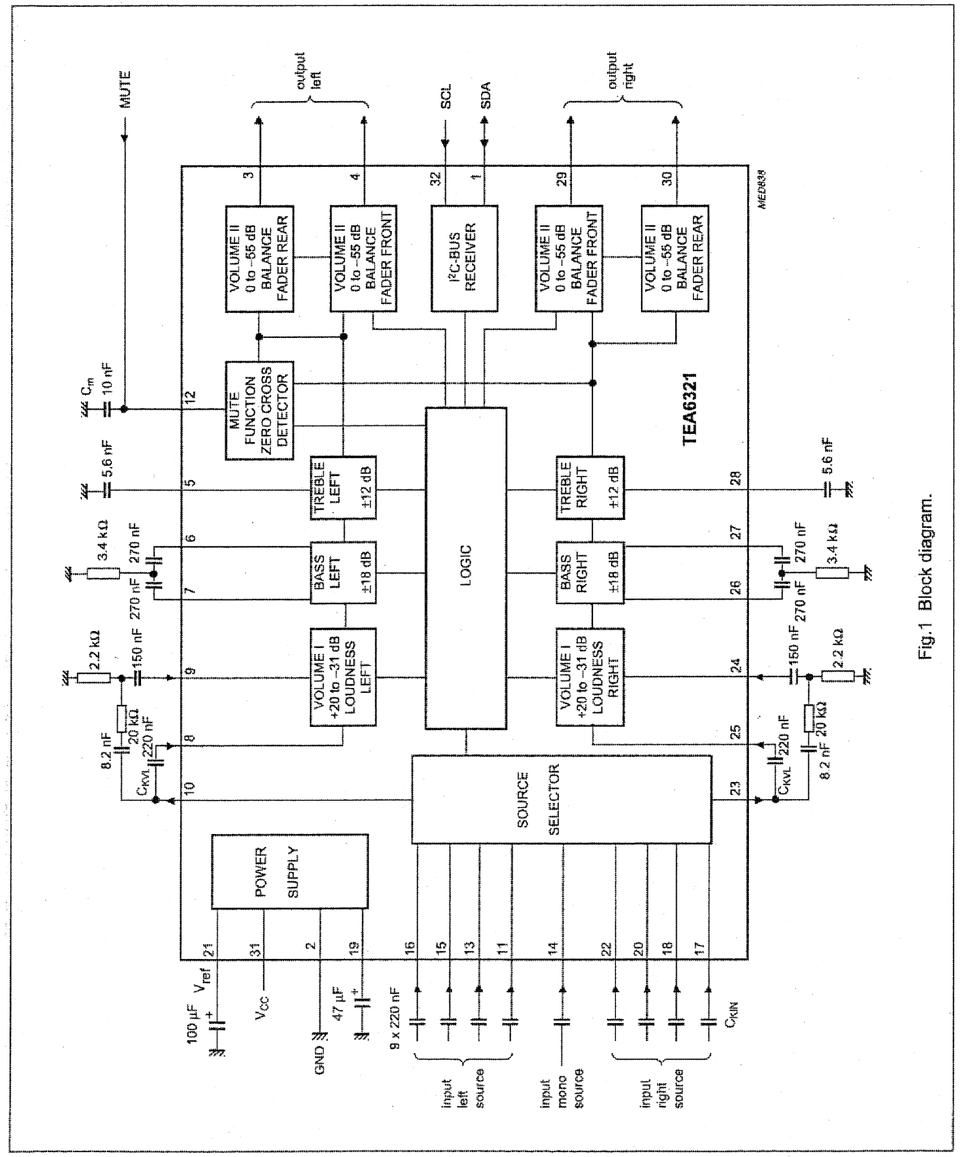
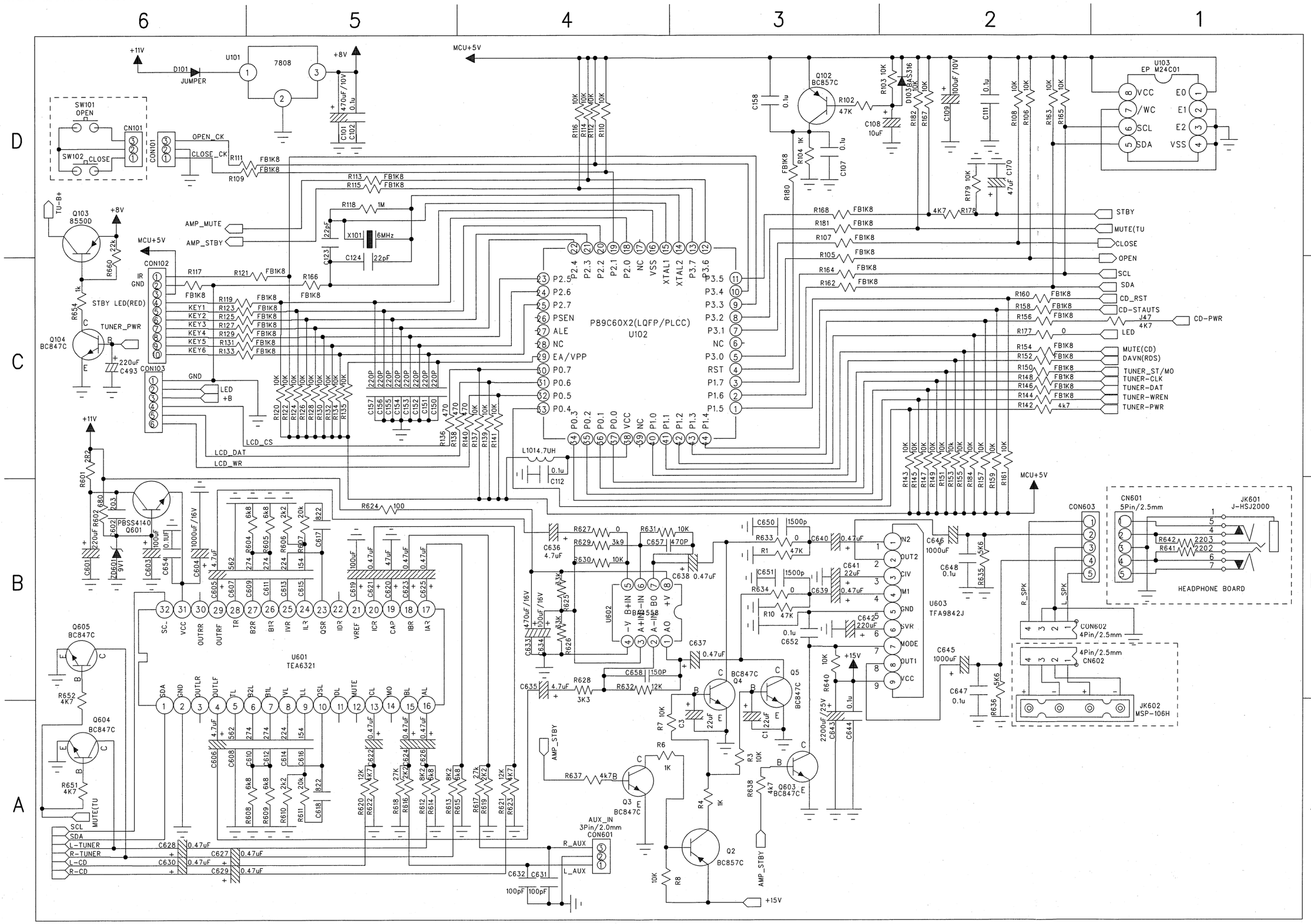


Fig.1 Block diagram.

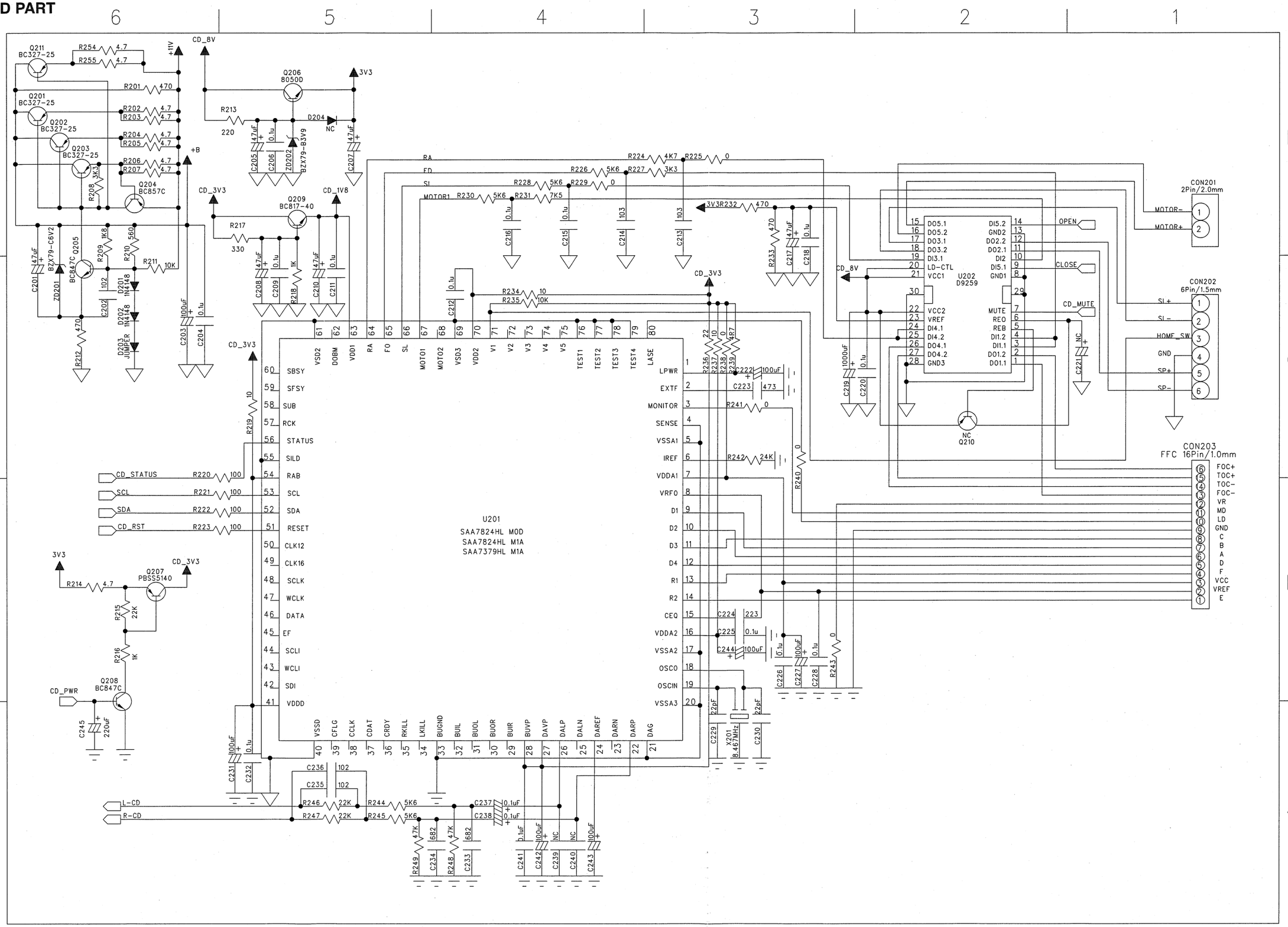
8-2

MAIN BOARD - CIRCUIT DIAGRAM
MCU & AMP. PART



8-3

MAIN BOARD - CIRCUIT DIAGRAM
CD PART



8-4

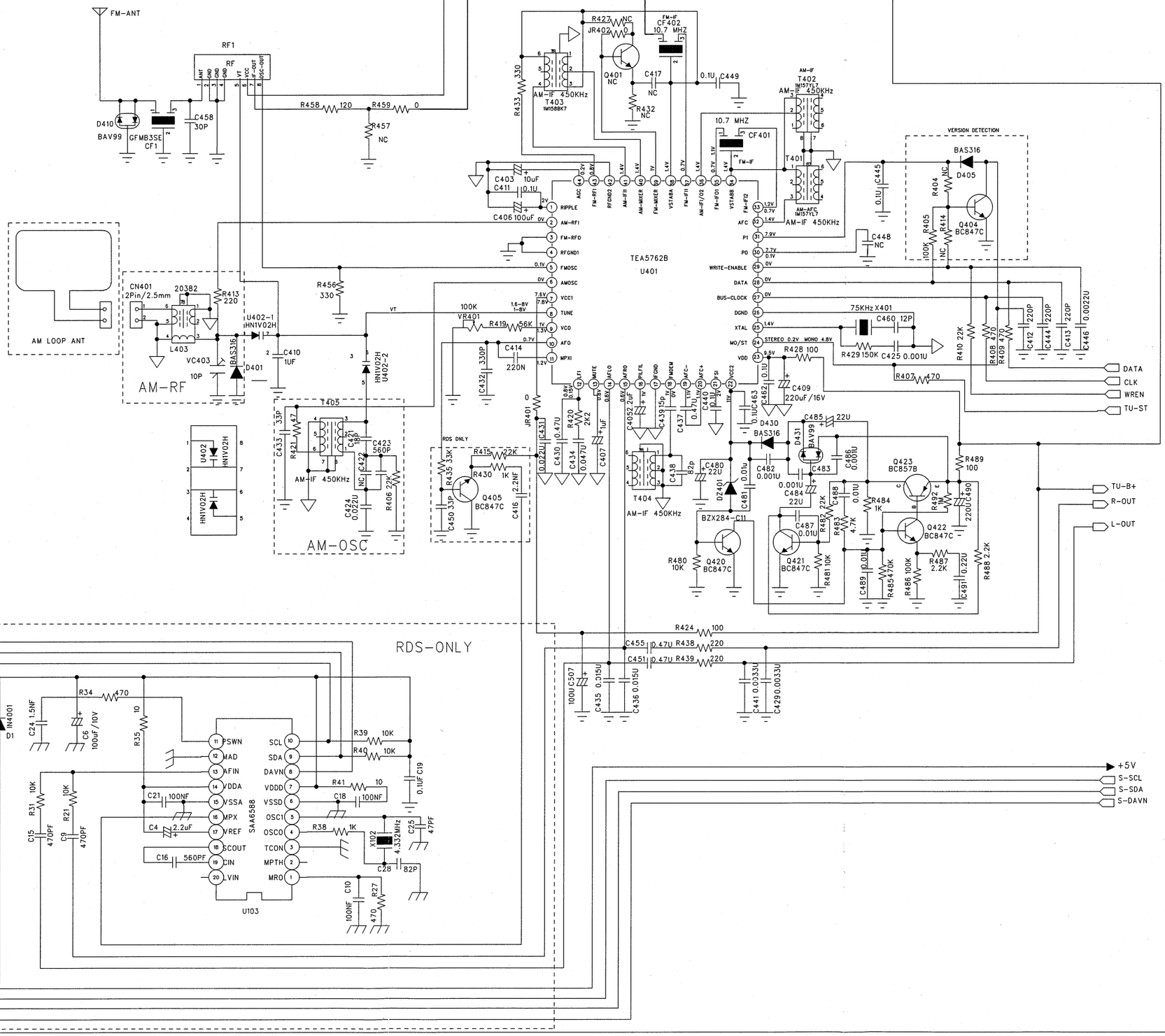
MAIN BOARD - CIRCUIT DIAGRAM
TUNER PART

VERSION	D405	R404	R414	R405	Q404
/00/02 FM/MW		☒	☒		☒
/01 FM/MW		☒		☒	☒
/14 FM-OIRT/MW	☒		☒		☒
/17 FM/AM	☒			☒	☒
/06 FM-JAPAN/AM				☒	☒

☒ Component mounted

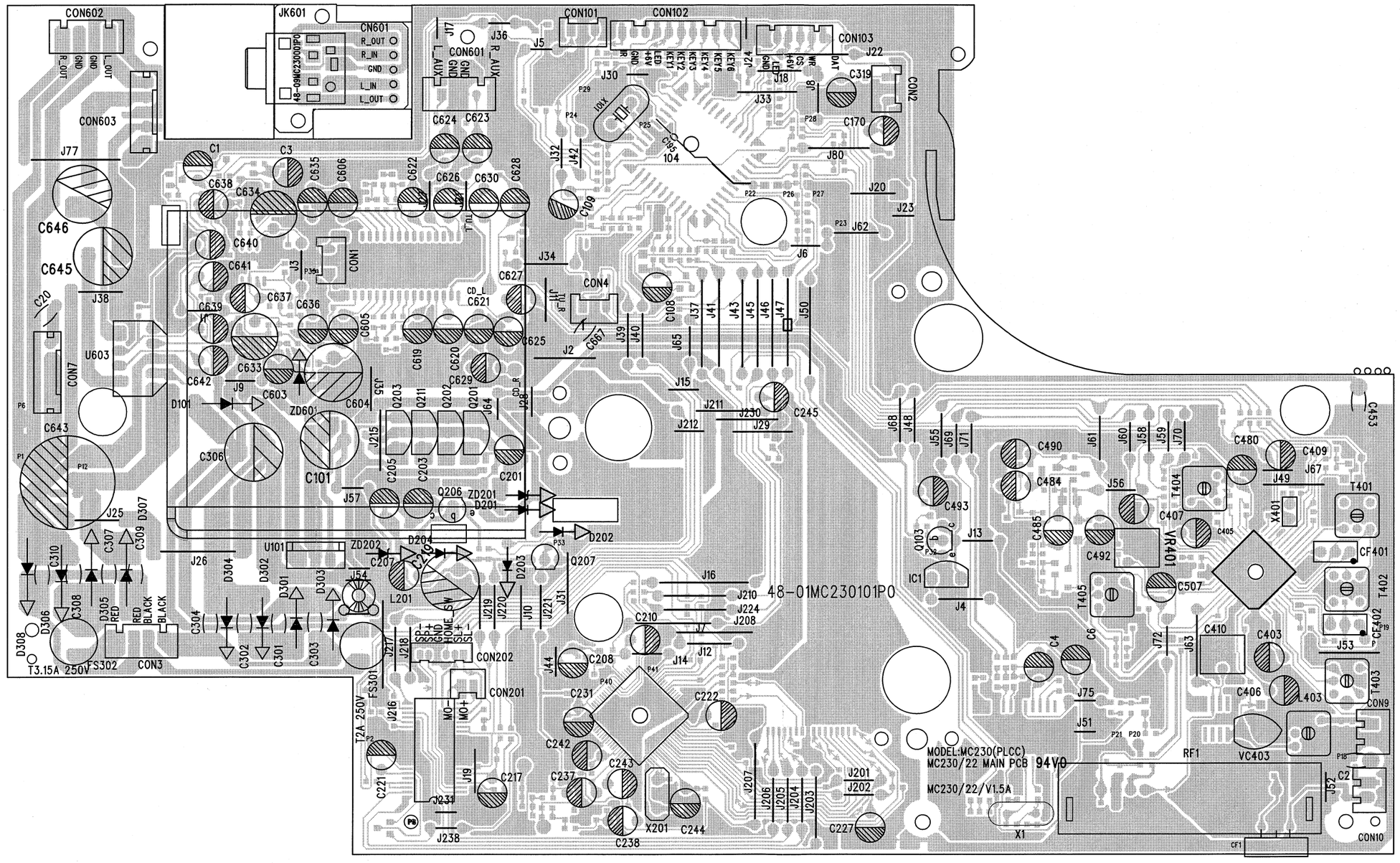
VERSION DETECTION

ITEM	USA	EU	JAPAN
C426	15P	12P	2P2
C428	0.033U	560P	



8-5

MAIN PCB - COMPONENT LAYOUT


48-01MC230101P0
MODEL:MC230(PLCC)
MC230/22 MAIN PCB 94V0
MC230/22/V1.5A
CON602
JK601
CN601
CON101
CON102
CON103
CON603
CON1
CON2
CON3
CON4
CON7
CON9
CON10
CON201
CON202
U603
U101
IC1
Q103
Q206
Q207
ZD201
ZD202
ZD601
D101
D201
D202
D203
D204
L201
X201
X401
VR401
RF1
VC403
T401
T402
T403
T404
T405
CF401
CF402
CF403
X1
T3.15A 250V
FS302
T2A 250V
FS301
RED
BLACK
C101
C104
C109
C201
C208
C210
C222
C231
C237
C238
C242
C243
C245
C306
C319
C453
C480
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D202
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D204
D301
D302
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D304
D305
D306
D307
D308
L201
Q201
Q202
Q203
Q206
Q207
R201
R202
R203
R204
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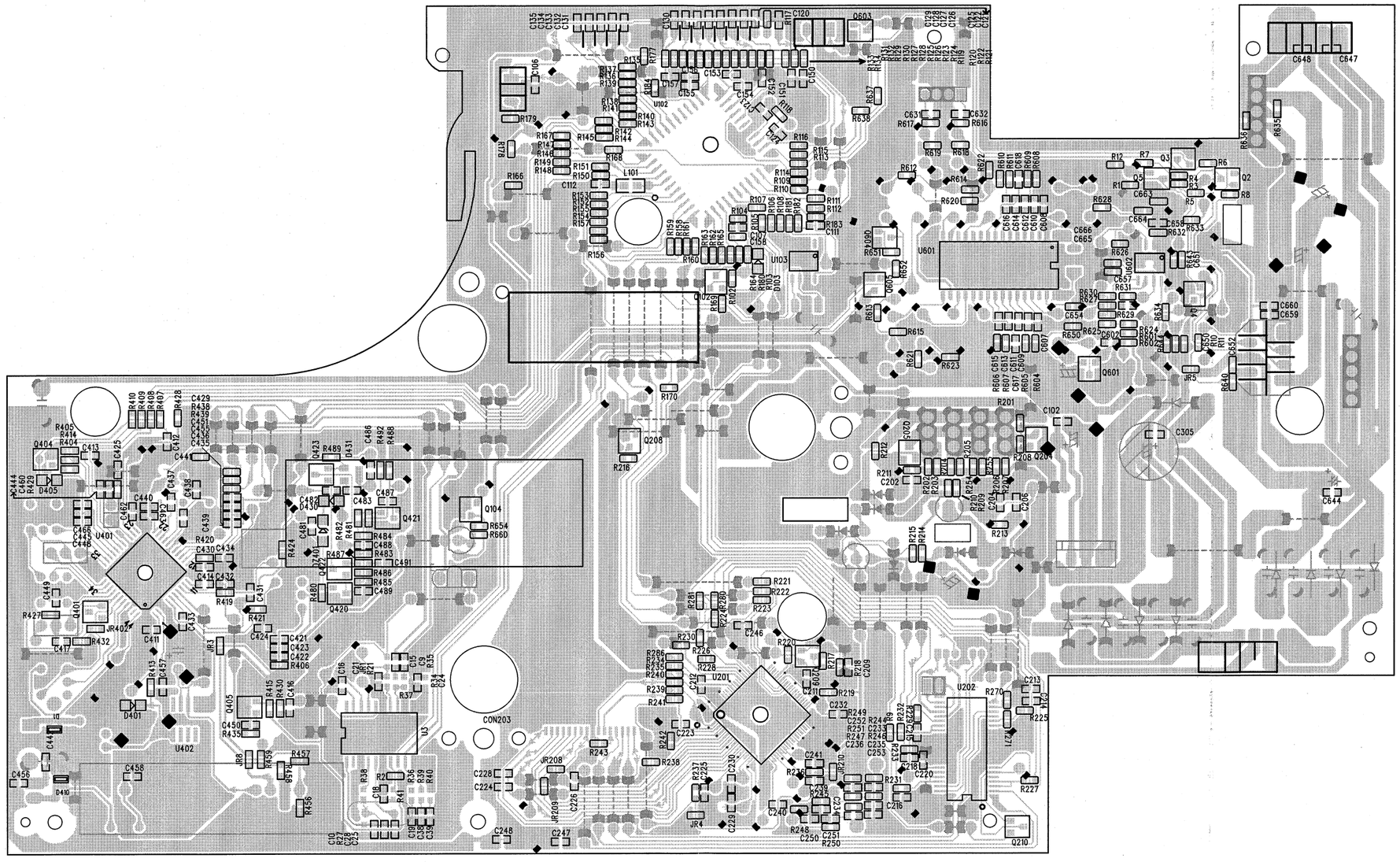
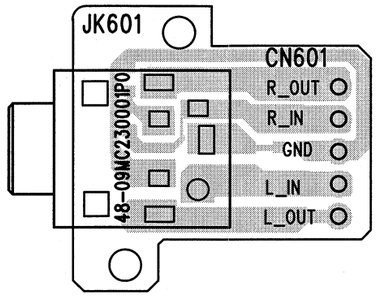
R226
R227
R228
R229
R230
R231
R232
R233
R234
R235
R236
R237
R238
R239
R240

8-6

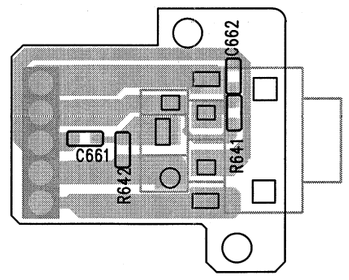
MAIN PCB - COMPONENT LAYOUT



HEADPHONE PCB - TOP LAYOUT



HEADPHONE PCB - BOTTOM LAYOUT



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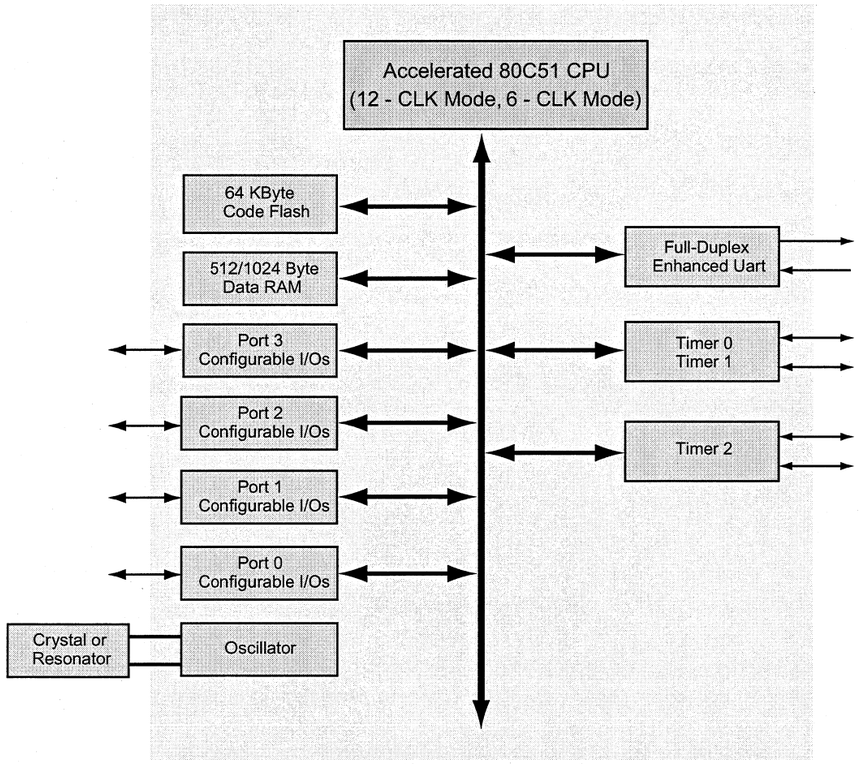
FLASH MICROCONTROLLER P89C60X2/P89C61X2--BLOCK DIAGRAM



9-1

DISPLAY BOARD

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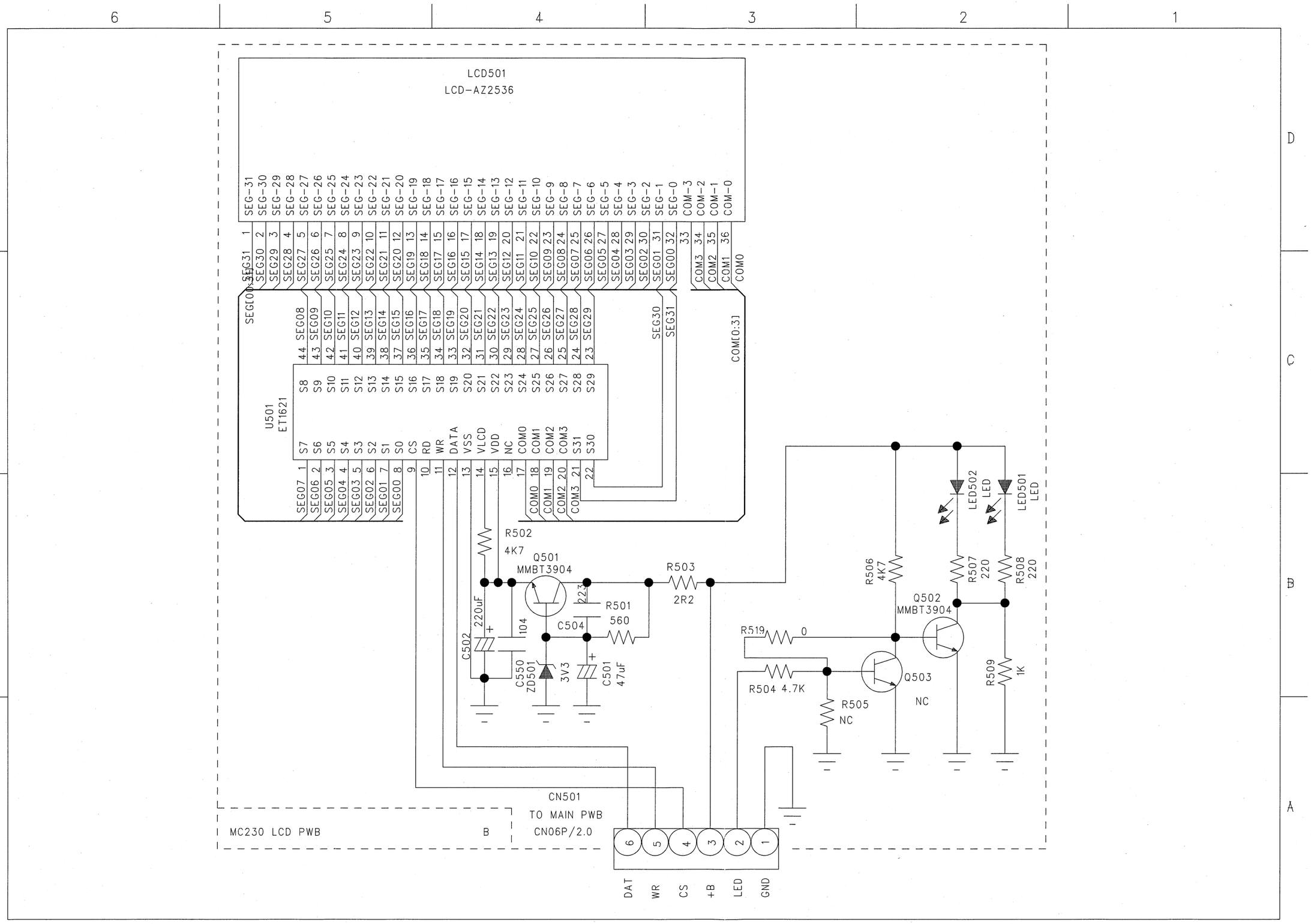
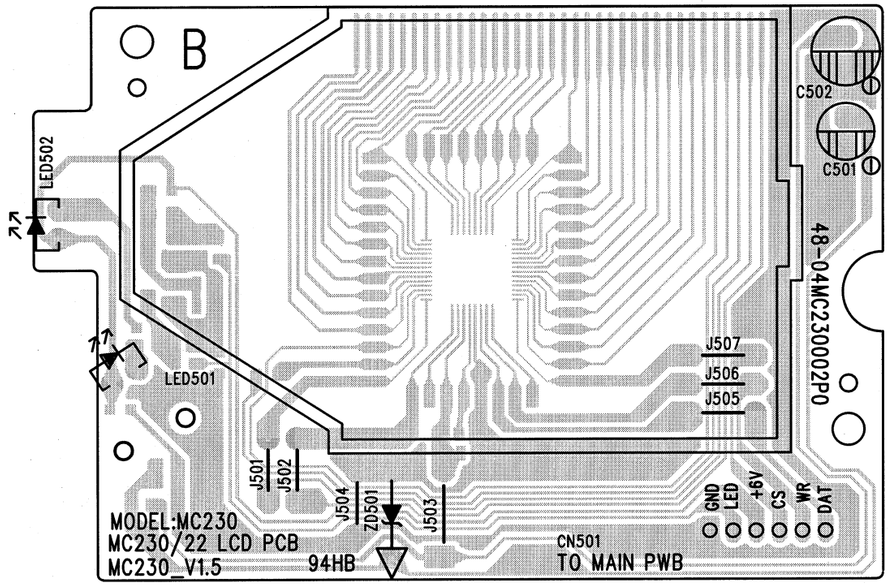
Layout Diagram-SMD 9-3

9-2

CIRCUIT DIAGRAM - DISPLAY BOARD

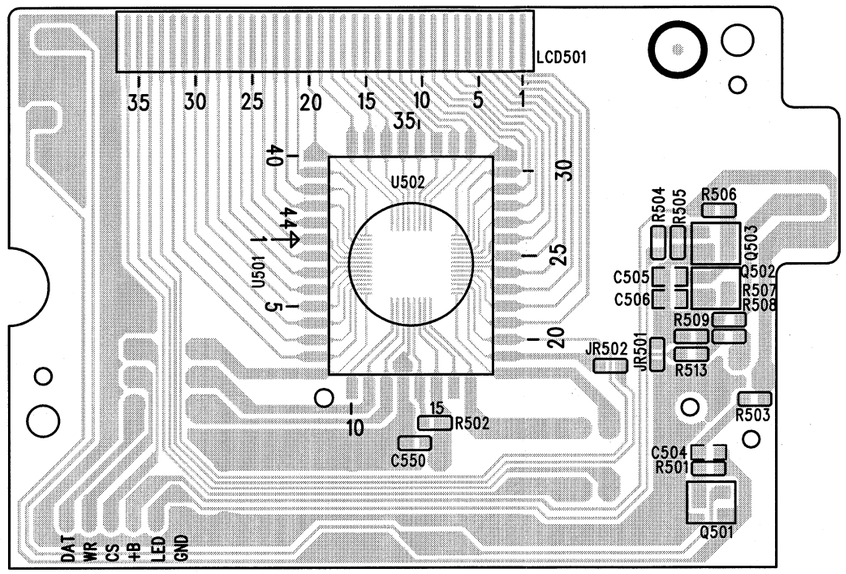


LAYOUT DIAGRAM - DISPLAY BOARD
COMPONENT SIDE



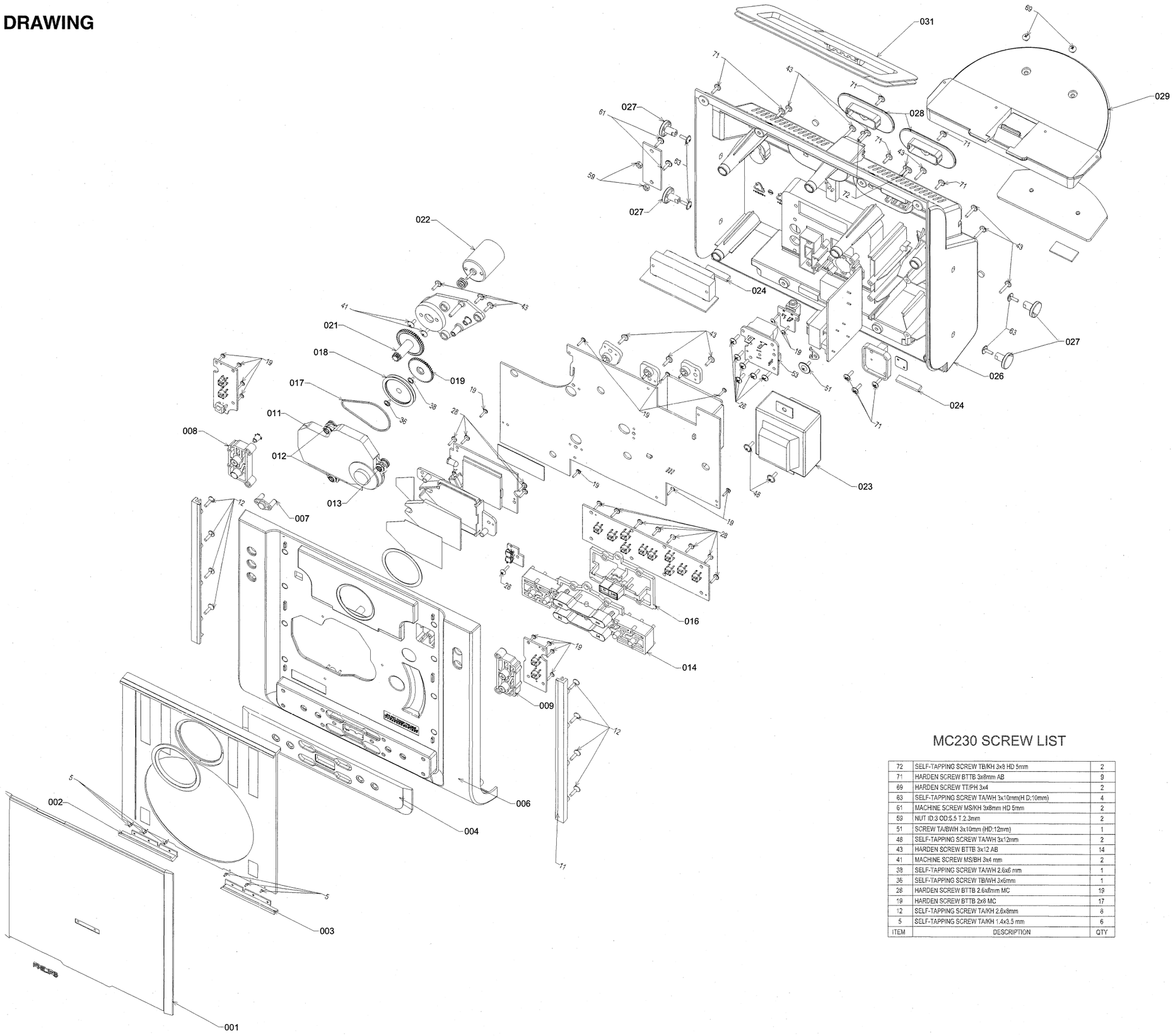
9-3

LAYOUT DIAGRAM - DISPLAY BOARD
SMD SIDE



10-1

EXPLODED DRAWING



MC230 SCREW LIST

72	SELF-TAPPING SCREW TB/KH 3x8 HD 5mm	2
71	HARDEN SCREW BTTB 3x8mm AB	9
69	HARDEN SCREW TT/PH 3x4	2
63	SELF-TAPPING SCREW TA/WH 3x10mm(H D:10mm)	4
61	MACHINE SCREW MS/KH 3x8mm HD 5mm	2
59	NUT ID:3 OD:5.5 T:2.3mm	2
51	SCREW TA/BWH 3x10mm (HD:12mm)	1
48	SELF-TAPPING SCREW TA/WH 3x12mm	2
43	HARDEN SCREW BTTB 3x12 AB	14
41	MACHINE SCREW MS/BH 3x4 mm	2
38	SELF-TAPPING SCREW TA/WH 2.6x6 mm	1
36	SELF-TAPPING SCREW TB/WH 3x6mm	1
28	HARDEN SCREW BTTB 2.6x8mm MC	19
19	HARDEN SCREW BTTB 2x6 MC	17
12	SELF-TAPPING SCREW TA/KH 2.6x8mm	8
5	SELF-TAPPING SCREW TA/KH 1.4x3.5 mm	6
ITEM	DESCRIPTION	QTY

MECHANICAL & ACCESSORIES PARTSLIST

001	9940 000 00303	CD DOOR LENS /22/25
001	9940 000 00595	CD DOOR LENS /21/30
001	9940 000 00599	CD DOOR LENS /37
002	9940 000 00292	CD DOOR COVER -LEFT
003	9940 000 00293	CD DOOR COVER -RIGHT
004	9940 000 00304	CONTROL PANEL LENS /22/25/37
004	9940 000 00596	CONTROL PANEL LENS /21/30
006	9940 000 00289	FRONT CABINET /22/25
006	9940 000 00318	FRONT CABINET /37
006	9940 000 00591	FRONT CABINET /21/30
007	9940 000 00305	SENSOR LENS
008	9940 000 00297	POW CD OPEN BUTT /22/25
008	9940 000 00321	POW CD OPEN BUTT /21/30/37
009	9940 000 00298	VOL +/- BUTTON /22/25
009	9940 000 00322	VOL +/- BUTTON /21/30/37
011	9940 000 00279	CD MECHANISM TPP381
012	9940 000 00287	SHOCK ABSORBER
013	9940 000 00288	SHOCK ABSORBER
014	9940 000 00302	FUNCTION BUTTON /22/25
014	9940 000 00324	FUNCTION BUTTON /21/30/37
016	9940 000 00299	FUNC BUTTON S/P /22/25
016	9940 000 00323	FUNC BUTTON S/P /21/30/37
017	9940 000 00589	DRIVE BELT (DIA:38X1MM)
018	9940 000 00296	DRIVER PULLEY GEAR
019	9940 000 00295	IDLER GEAR
021	9940 000 00294	DRIVING GEAR
022	9940 000 00286	MOTOR 5V
023	⚠ 9940 000 00278	TRANSFORMER 230V /22/25
023	⚠ 9940 000 00316	TRANSFORMER 120V /37
023	⚠ 9940 000 00597	H/TRANSFORMER 120/230V /21
023	⚠ 9940 000 00598	H/TRANSFORMER 240V /30
024	9940 000 00284	RUBBER FOOT
026	9940 000 00291	REAR CABINET /22/25/30
026	9940 000 00319	REAR CABINET (94V2) /37
026	9940 000 00592	REAR CABINET /21
027	9940 000 00283	SPEAKER HOLDER
028	9940 000 00307	SPEAKER WIRE HOLDER
029	9940 000 00306	STAND UNIT
031	9940 000 00243	AM/FM ANT ASS'Y /21/22/25/30
031	9940 000 00308	AM/FM ANT ASS'Y /37
	⚠ 9940 000 00512	AC CORD BS PLUG 2M /25
	⚠ 9940 000 00593	AC CORD SAA APP 2M /30
	9940 000 00246	REMOTE CONTROL UNIT
	9940 000 00247	SPEAKER BOX UNIT (LEFT)
	9940 000 00309	SPEAKER BOX UNIT (LEFT) /37
	9940 000 00248	SPEAKER BOX UNIT (RIGHT)
	9940 000 00311	SPEAKER BOX UNIT (RIGHT)/37
	⚠ 9940 000 00282	AC CORD VDE APP 2M /21/22
	⚠ 9940 000 00317	AC CORD CUL APP 6FT /37

Note: Only these parts mentioned in the list are normal normal service parts.

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ELECTRICAL PARTSLIST

AUX□	9940 000 00281□	RCA JACK BD 2P□
CF1□	9940 000 00245□	BAND PASS FILTER□
D407□	9940 000 00312□	VARICAP DIODE /21/30/37□
D408□	9940 000 00312□	VARICAP DIODE /21/30/37□
FS300□	9940 000 00588□	GLASS FUSE T800MA/250V/21□
FS301□⚠	9940 000 00258□	CERAMIC FUSE /22/25/37□
FS301□⚠	9940 000 00585□	CERAMIC FUSE 2A/250V /21/30□
FS302□⚠	9940 000 00259□	CERAMIC FUSE /22/25/37□
FS302□⚠	9940 000 00586□	GLASS FUSE 3.15A/250V /21/30□
FS303□⚠	9940 000 00263□	SUBMINIATURE FUSE 100MA/250V□
IC1□	9940 000 00277□	IC (LIBERAL) LM78L05□
JK401□	9940 000 00275□	RCA PIN JACK #RCA-125□
JK601□	9940 000 00257□	PHONE JACK MSJ-2000(ST)□
JK602□	9940 000 00276□	SPK JACK (R/B/R/B)□
LCD501□	9940 000 00268□	LCD DISPLAY□
LED501□	9940 000 00266□	LED LAMP 3MM (BLUE)□
LED502□	9940 000 00267□	LED LAMP 5MM (BLUE)□
LED503□	9940 000 00265□	LED LAMP (MICRO)□
RF1□	9940 000 00256□	TUNER (MITSUMI) FE450-G01□
RL301□	9940 000 00264□	RELAY□
S501□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S502□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S503□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S504□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S505□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S506□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S507□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S508□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S509□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S510□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S511□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S512□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S513□	9940 000 00274□	TACT SWITCH TSA-064301-100□
S514□	9940 000 00274□	TACT SWITCH TSA-064301-100□
SR501□	9940 000 00272□	OPTIC SENSOR /22□
SR501□	9940 000 00325□	OPTIC SENSER /21/30/37□
SW601□	9940 000 00273□	MICRO SWITCH 1120B□
SW602□	9940 000 00273□	MICRO SWITCH 1120B□
T302□ ⚠	9940 000 00262□	TRANSF. EI-28 AC230V /22/25□
U101□	9940 000 00253□	IC (SAMSUNG) KA7808□
U102□	9940 000 00244□	IC P89C60X2BBD /22/25□
U102□	9940 000 00368□	IC P87C58X2BBD /21/30/37□
U103□	9940 000 00251□	IC (ROHM) BR24L04□
U201□	9940 000 00365□	IC (PHILIPS) SAA7379HL CD-18□
U202□	9940 000 00252□	IC MOTOR DRIVER D9259□
U301□	9940 000 00261□	IC (LIBERAL) LM78L05□
U401□	9351 772 20557□	IC SM TEA5762H/V1 (PHSE) Y□
U501□	9940 000 00269□	IC ET1621 COB LCD DRIVER□
U601□	9940 000 00366□	IC TEA6321□
U602□	9940 000 00249□	IC (ROHM) BA4558F □
U603□	9940 000 00367□	IC (PHILIPS) TFA9842J□
VC402□	9940 000 00314□	TRIMMER 10PF 6MM□
VC403□	9940 000 00254□	TRIMMER 10PF 6MM (WH)□
VR401□	9940 000 00313□	SEMI FIXED VRB100K 6MM□
X201□	9940 000 00255□	CER RESONATOR 8.4672MHz
	9940 000 00587□	SWITCH /21M□

Note: Only these parts mentioned in the list are normal normal service parts.

REVISION LIST

1.1 Manual 3141 785 30021

In this version, the schematics of CD section and Tuner section are added.

P8-1 : Main Board

P8-2 : Circuit Diagram-- MCU and Amplifier Part

P8-3 : Circuit Diagram-- CD Part

P8-4 : Circuit Diagram-- Tuner Part

P8-5 to P8-6: PCB Layouts